Group A Streptococcus (Invasive)

September 2004

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Invasive group A streptococcal disease is caused by the bacterium, *Streptococcus pyogenes.* There are over 100 serologically distinct types of *S. pyogenes* within group A.

B. Clinical Description and Laboratory Diagnosis

Pharyngitis ("strep throat") is the most common result of infection with group A streptococcus (GAS). Skin infections (impetigo or pyoderma) are also common. In those two conditions, infection of the deeper tissue or blood is very uncommon. However, in some cases the bacteria may become invasive and cause more severe illness. Invasive GAS may manifest as any of several clinical syndromes, including: 1) pneumonia, 2) bacteremia in association with cutaneous infection, 3) deep soft tissue infection (*i.e.*, necrotizing fasciitis [colloquially referred to as "flesh-eating bacteria"]), 4) meningitis, 5) peritonitis, 6) osteomyelitis, 7) septic arthritis, 8) postpartum sepsis (*i.e.*, puerperal fever), 9) neonatal sepsis, and 10) bacteremia. Case-fatality ratios for some of these syndromes can be as high as 10–70%. Risk factors include chickenpox in children, human imuunodeficiency virus infection, diabetes mellitus, and chronic cardiac, or pulmonary disease.
Laboratory diagnosis is based on culture of *S. pyogenes* from a clinical specimen.

C. Reservoirs

Humans are the only reservoir for *S. pyogenes*.

D. Modes of Transmission

The modes of transmission of GAS bacteria are large respiratory droplets and person-to-person spread through direct contact with patients or carriers. Indirect person-to-person spread through objects can sometimes transmit GAS bacteria as well. Nasal, throat, skin, anal and vaginal carriers of GAS can all serve as sources of infection.

E. Incubation Period

The incubation period for GAS pharyngitis is usually 1 to 5 days, rarely longer. The incubation period for invasive GAS disease is variable.

F. Period of Communicability or Infectious Period

In untreated, uncomplicated GAS disease, the infectious period starts several days before onset of symptoms and lasts from 10 to 21 days. If purulent discharges are present, the infectious period may be extended to weeks to months. Persons with untreated GAS pharyngitis may carry and transmit the bacteria for weeks or months, with sharply decreasing contagiousness 2 to 3 weeks after illness onset.

G. Epidemiology

Estimates of the annual incidence rates of invasive GAS in North America have ranged from 1.5 to 7.0 cases per 100,000. In the United States, the Centers for Disease Control and Prevention (CDC) estimates the rate to be 3.3 cases per 100,000. Of the estimated 10,000–15,000 cases of invasive GAS in the United States each year, between 500 and 1500 cases develop necrotizing fasciitis. Surveillance studies have suggested that 85% of cases occur sporadically in the community, 10% are hospital-acquired, 4% occur in long-term care facilities and 1% occur after close contact with a case. Nosocomial outbreaks and cases of invasive GAS have been traced to healthcare workers who were anal, vaginal, skin or throat carriers of GAS.

Invasive GAS occurs year-round with a peak incidence reported from December through March. People who have chronic cardiac or pulmonary disease, diabetes mellitus or HIV infection, or who inject drugs or abuse alcohol are believed to be at higher risk for invasive GAS infection. In children, varicella infection has been identified as a significant risk factor. Infection with GAS may be followed by the non-infectious complication

of rheumatic fever (characterized by arthritic, cardiac, neurologic signs and symptoms) or glomerulonephritis. One goal of treating cases (with at least 10 days of antibiotic therapy) is to prevent these sequelae.

2) REPORTING CRITERIA AND LABORATORY TESTING SERVICES

A. New Jersey Department of Health and Senior Services (NJDHSS) Case Definition:

CASE CLASSIFICATION

A. CONFIRMED
Isolation of Group A streptococcus (*S. pyogenes)* from a normally sterile site (*e.g.*, blood or cerebrospinal fluid or less commonly, joint, pleural, or pericardial fluid).

B. PROBABLE
Clinically compatible case that is epidemiologically linked to a confirmed case.

C. POSSIBLE
Not used.

B. Laboratory Testing Services Available

The New Jersey Department of Health and Senior Services Public Health and Environmental Laboratories (PHEL) will confirm isolates of suspected *S. pyogenes* from appropriate clinical sources.

Note: **All isolates of *S. pyogenes* from normally sterile sites (blood and spinal fluid) must be referred to the NJDHSS PHEL per New Jersey Administrative Code (N.J.A.C 8:57-1.8).**
Isolates are to be submitted to the, Division of Public Health and Environmental Laboratories, P. O. Box 361, John Fitch Plaza, Trenton, NJ 08625-0361.

3) DISEASE REPORTING AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To identify close contacts of the case and provide recommendations for appropriate preventive measures and thus prevent infection and complications in the contacts and further spread of infection.
- To provide information about the disease, its transmission, and methods of prevention.
- To promptly identify clusters or outbreaks of disease in order to initiate appropriate prevention and control measures. If an outbreak of invasive GAS is identified in a community or organization such as a school or daycare center, varicella vaccination might be recommended if cases are associated with chickenpox, or prophylactic antibiotics might be recommended to certain groups depending on the number of cases and the community or organization involved.

B. Laboratory and Healthcare Provider Reporting Requirements

The New Jersey Administrative Code (N.J.A.C.) 8:57-1.8 stipulates that health care providers and laboratories report (by telephone, confidential fax, over the Internet using Communicable Disease Reporting System [CDRS] or in writing) all invasive cases of GAS to the local health officer having jurisdiction over the locality in which the patient lives, or, if unknown, to the health officer in whose jurisdiction the health care provider requesting the laboratory examination is located.

C. Local Department of Health Responsibilities

1. **Reporting Requirements**
   The N.J.A.C. 8:57-1.8 stipulates that each local health officer must report the occurrence of any case of invasive GAS, as defined by the reporting criteria in Section 2 A above. Current requirements are that cases be reported to the NJDHSS Infectious and Zoonotic Diseases Program electronically using the confidential and secure Communicable Disease Reporting System (CDRS). The report can also be filed in writing using an official form, CDS-1.

2. **Case Investigation**
   a. It is requested that the local health officer complete the CDS-1 form by interviewing the patient and others who may be able to provide pertinent information. Much of the information required on the form can be obtained from the patient's healthcare provider or the medical record.

   b. Use the following guidelines for assistance in completing the form:
      1) Accurately record the demographic information.
      2) Accurately record clinical information, including date of symptom onset, whether hospitalized (and associated hospital information and dates), and other medical information.
      3) Indicate the type of infection caused by GAS.
      4) Indicate the type of specimen from which GAS was isolated/identified (*e.g.*, blood, CSF).
      5) Note the date of the first positive culture.
      6) Ask about varicella history because invasive GAS may be a complication of a prior varicella infection.
      7) If there have been several attempts to obtain case information, (*e.g.*, the patient or healthcare provider does not return calls or respond to a letter, or the patient refuses to divulge information or is too ill to be interviewed), please fill out the form with as much information as possible. Please note on the form the reason why it could not be filled out completely. **If CDRS is used to report, enter collected information into the "Comments" section.**

   c. After completing the form, it should be mailed in an envelope marked "Confidential" to the NJDHSS Infectious and Zoonotic Diseases Program, or the report can be filed electronically over the Internet using the CDRS. The mailing address is:

      NJDHSS
      Division of Epidemiology, Environmental and Occupational Health
      Infectious and Zoonotic Diseases Program
      P.O.Box 369
      Trenton, NJ 08625-0369

   d. Institution of disease control measures is an integral part of case investigation. It is the local health officer's responsibility to understand, and, if necessary, institute the control guidelines listed below in Section 4, "Controlling Further Spread."

4) CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements (N.J.A.C. 8:57-1.10)

None.

B. Protection of Contacts of a Case

Depending on the number of cases of invasive GAS, in certain settings or situations, recommendations may include antibiotic prophylaxis for potential carriers, varicella vaccination for susceptible children, and throat cultures for contacts of cases. See Section 4 C, "Managing Special Situations," directly below.

C. Managing Special Situations

Daycare

One case of invasive GAS in a daycare center is not usually a cause for alarm. However, to determine the extent of the situation, the following questions should be posed:

- Was the case-patient's illness preceded by varicella infection?
- Have any varicella cases been reported in the daycare center in the previous 2 weeks? If so, how many and what were the dates of onset?
- Have any cases of pharyngitis or impetigo been reported at the daycare in the previous 2 weeks? If so, how many and what were the dates of onset?

The recommendations for control will depend on the answers to these questions. Contact the NJDHSS IZDP at 609.588.7500 to report suspected or confirmed cases in a daycare center (or any other setting). The IZDP staff will work with the local health officer to ensure all contacts are identified and notified. In addition, surveillance data are necessary to determine the presence of an outbreak or cluster of cases of disease.

School

As described above for daycare centers, one case of invasive GAS in a school is not necessarily a cause for alarm. While GAS is much more likely to spread in a daycare setting, the health officer will need to determine if the case-patient recently had varicella and how many cases of pharyngitis, impetigo and varicella are occurring in the school. As in a daycare center, the recommendations for control will depend on the answers to these questions.

Hospital

GAS is an unusual cause of surgical site or post-partum infections. The bacterium is only isolated from <1% of surgical-site infections and 3% of infections after vaginal delivery. Since most nosocomial transmission is traced to carriers involved in direct patient care, even one case of post-operative or post-partum GAS should be vigorously investigated. Usually the infection control professional (ICP) or hospital epidemiologist will investigate to find a possible carrier. Investigations usually consist of medical and laboratory record reviews, further testing of the GAS isolates, screening of healthcare workers from multiple sites, and sometimes environmental testing.

Long-Term Care Facilities

Cases of invasive GAS infection in a long-term care facility, while rare, sometimes do occur. Steps should be taken to rule out the possibility of a more widespread problem. Surveillance should be done on the floor where the case-patient resides for other residents with possible symptoms of GAS infection, such as fever or sore throat. These residents should be tested for GAS infection and treated if positive. Additional cases of invasive GAS would require a more vigorous response. The NJDHSS IZDP will work with the local health officer to determine the best prevention and control measures to implement and how to proceed with a more rigorous investigation. This might involve screening healthcare workers and asymptomatic residents, and perhaps environmental testing.

Reported Incidence Is Higher than Usual/Outbreak Suspected

If the number of reported cases in the city/town is higher than usual, or if an outbreak in a school, daycare center, hospital or long-term care facility is suspected, the health officer should contact the IZDP as soon as possible at 609.588.7500. This situation may warrant an investigation of clustered cases to determine a course of action to prevent further cases. The IZDP staff can also perform surveillance for cases that cross several jurisdictions and therefore be difficult to identify at a local level.

D. Preventive Measures

Environmental Measures

Daycare centers should be advised to clean toys daily using an approved disinfectant (i.e., an EPA-registered sanitizing solution safe for use in the daycare setting) and to discourage the use of play food, which facilitates the transmission of not only this bacterium but many others as well.

Personal Preventive Measures/Education

To avoid future exposures, advise individuals to:

- Practice good hygiene and frequent handwashing.
- Avoid sharing food, beverages, cigarettes or eating utensils.
- Receive varicella vaccine if susceptible (see the "Chickenpox and Shingles" chapter for more information).

ADDITIONAL INFORMATION

Additional information about GAS infection are available on CDC website (http://www.cdc.gov)/

The CDC surveillance case definition for invasive GAS infection is the same as the criteria outlined in Section 2A of this chapter. CDC case definitions are used by state health departments and CDC to maintain uniform standards for national reporting. For reporting to the NJDHSS, always refer to the criteria in Section 2 A.

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